

Assessment Report, 2014/2015 Academic Year Mathematics General Education Program

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Introduction

This math department serves two important roles in the general education of OIT students: (1) Students receive basic mathematical training expected of any college graduate. (2) Students receive major-specific mathematical training in support of courses taken in their majors.

Mission

All OIT students will receive a basic mathematics education expected of a college graduates. Those needing it will receive further instruction in support of their major courses of study.

Educational Objectives

Individuals having completed their required math courses at OIT will have an understanding of the fundamental skills of mathematics, and will understand and be able to apply mathematical concepts as needed in their major courses and daily lives.

Expected Student Learning Outcomes

Upon completion of their required math courses, students will be able to

1. apply mathematical concepts and principles to perform symbolic computations
2. create, use and analyze graphical representations of mathematical relationships
3. use mathematical concepts and techniques to solve applied problems

Data Collection/Assessment Schedule

Program Student Learning Outcomes	Academic Year Assessed		
	'12-13	'13-14	'14-15
1. Apply mathematical concepts and principles to perform symbolic computations.		X	
2. Create, use and analyze graphical representations of mathematical relationships.	X		
3. Use mathematical concepts and techniques to solve applied problems.			X

Table 1: Assessment schedule.

2014/15 Assessment Activities

Outcome 3 has been an issue with regards to assessment during every assessment cycle. There is disagreement amongst faculty as to what constitutes “applied” problems and how much credit should be given to each component of the solution process.

Several issues arose in the attempt to assess Outcome 3 in Math 111 during the 2011/12 academic year. The following activities are planned for 2014/15:

- We will use a single problem in each of math 111 and 361 designed to consider each of the portions of the solutions process for an applied problem. These sections are selecting the appropriate model, solving the model for the necessary information, and interpreting the results in the context of the original problem.

Assessment Results

The problem for math 111 involved being presented with two different investment opportunities and deciding which would be the best investment by comparing doubling times for the investment.

Part 1: Identify the correct model.

Of the 42 students in our sample, 30 answered correctly: 71% of the students

Part 2: Identify the solution to the model you chose (they could get credit if they selected the wrong original model as well)

Of the 42 students in our sample, 28 answered correctly: 66.7% of the students

Part 3: Interpret your solution in the context of the original problem (once again, they could obtain credit if they were to answer the previous parts incorrectly but were to make the correct decision based on their previous work.

Of the 42 students in our sample, 21 answered correctly: 50%

A complete table of the results follows:

Part 1	Part 2	Part 3	Count
Correct	Correct	Correct	14
		Incorrect	8
	Incorrect	Correct	1
		Incorrect	7
Incorrect	Correct	Correct	3
		Incorrect	3
	Incorrect	Correct	3
		Incorrect	3

What we can see from this table is that:

- a.) Those students who were capable of picking the right model were no more or less likely to interpret their solution correct than students who could not pick the correct original model (a bit disturbing).
- b.) Those students who were able to correctly solve whatever model they chose (regardless of correctness of the model) were able to identify the correct conclusion based on their data indicating that there is a positive association between these two areas of applied problem solving.
- c.) Those students who chose the correct model were much more likely to be able to solve that model than students who chose the incorrect model in the first place.

For math 361, the assessment question was a very standard two sample t test question.

Part 1: Students must choose the correct statistical test to test the claim.

Of the 22 students tested, 19 answered correctly: 86% of the students

Parts 2 and 3 were dealing with the mechanics of the question where the value of the test statistic and degrees of freedom were determined and reported.

Of the 22 students, 20 answered each of these correctly: 90.91% of the students

Part 4 required the students to apply the p-value method to determine where there was evidence to support the scientific claim made in the problem.

Of the 22 students tested, 17 answered correctly: 77% of the students

The results here indicate that, while the majority of students were able to determine the correct method and carry out the method to answer the question, a few of these have difficulty interpreting the solution in the context of the original problem. This was expected; however, the percentage of correct answers on these problems is significant.

Evidence of Student Learning

Both exercises are essentially equivalent in difficulty with concepts differing from course to course. Also, in both, the result indicate that, while our students are reasonably skilled at picking the correct model/method and carrying out these processes, more emphasis should be placed on what the solution actually means.

Changes Resulting From Assessment

There were no activities in this area this year.

Appendix A: Student Learning Outcomes/Course Curriculum

The courses listed in the following table are the core of the Mathematics Department's service courses, and are offered every term. The table indicates the extent to which each of the three student learning outcomes is addressed in each course. *Emphasized* indicates that there are at least three *core* performance criteria addressing that outcome, and *addressed* indicates that there are some performance criteria (core or non-core) addressing the outcome.

Course	Student Learning Outcome		
	Computation	Graphing	Application
Math 111	Emphasized	Emphasized	Addressed
Math 112	Emphasized	Emphasized	Emphasized
Math 251	Emphasized	Addressed	Emphasized
Math 252	Emphasized	Addressed	Emphasized
Math 254N	Emphasized	Addressed	Addressed
Math 321	Emphasized	Addressed	Emphasized
Math 361	Emphasized	Emphasized	Emphasized